DESIGN AND CONSTRUCTION OF AN ELECTRONIC TIMED MOSQUITO FLEETING SYSTEM

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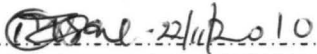### FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

NOVEMBER, 2010.

DEDICATION

This work is dedicated to the Almighty God for protecting me and guiding me throughout my stay in this school and to my family for encouraging me and believing in me.

DECLARATION

I Ozoemena Tochukwu .U.J, declare that this work was done by me and has never been presented elsewhere for the award of degree. I also hereby relinquish the copyright to the Federal University of Technology, Minna.

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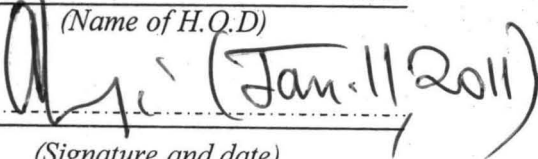
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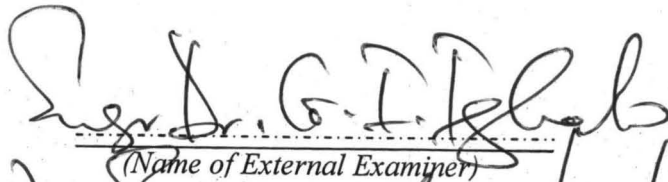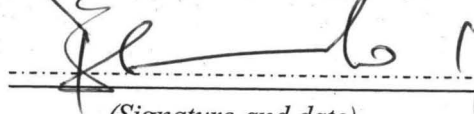*(Signature and date)*

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CHAPTER ONE

1.0   INTRODUCTION

Malaria, which kills more than a million persons every year, is most deadly among children and is particularly prevalent in sub-Saharan Africa. It is transmitted by female Anopheles mosquitoes infected with the malaria parasite. No vaccine against malaria is available.

1.1   Electronic Timed Mosquito Fleeting System

Electronic timed mosquito fleeting system is an alternative to other forms of mosquito control systems. The availablity of a different type of mosquito-fighting product on the market gives consumers the flexibility of choosing the repellent product that is right for them. With a variety of selections to choose from, it is important to know the benefits of each type of repellent from which you are choosing. An electronic timed fleeting system turns on the fleet at a specified time for two hours every day. This allows protection from perturbing insects, without forcing you and your children to cover you skin in strong chemicals with harsh ingredients and strong odours. It also saves time and energy since nobody needs to be around to operate it, and it can be timed to fleet the room when nobody is in the house. This electronic product will last a long time, and is a successful mosquito repellent alternative compared to conventional hand spray-on repellents.

This type of mosquito repellent is highly valuable because nobody needs to be around to spray harmful chemicals; you can time the system to work when everyone has gone to school or work. When you pursue happiness with your family and friends, you do so

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because you want to spend time enjoying their company and your activities. Stinging mosquitoes can detract from this experience, leaving itching bites that scratch for days on end.

Electronic mosquito repellent offers a safe alternative to traditional repellents. It can alleviate the annoyance of being stung and the discomfort of waiting for the stings to heal. It also helps keep your family safe from West Nile virus and other communicable diseases. With your mind off the bugs and their bites, you can better enjoy your time indoors when you come back home from work.

```
                        ┌──────────────────┐
                        │   POWER UNIT     │
                        └──────────────────┘
                          │        │      │
┌──────────────┐    ┌──────────────────┐    ┌──────────────┐
│  INPUT UNIT  │───▶│  MICROCONTROLLER │───▶│   DISPLAY    │
│              │    │      UNIT        │    │  UNIT (LCD)  │
└──────────────┘    └──────────────────┘    └──────────────┘
                             │
                    ┌──────────────────┐
                    │   FLEET UNIT     │
                    └──────────────────┘
```
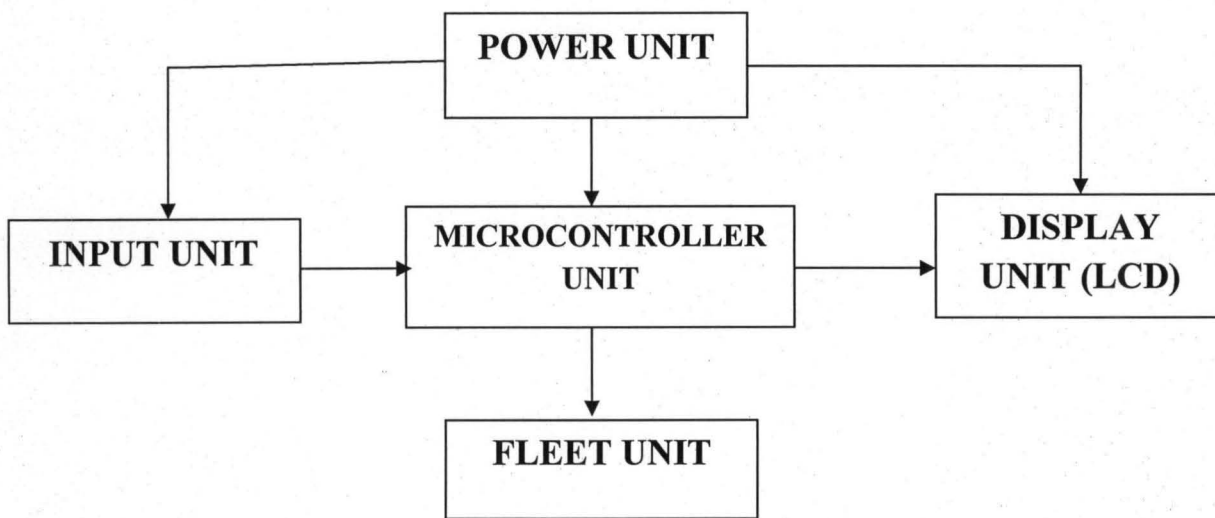
Fig. 2.1   Block diagram of Electronic timed fleet system

1.2   Project Aims and Objectives

The design and construction of an electronic timer mosquito fleet system is aimed at:

(i) Automatically spraying/fleeting a house at a specified time

(ii) Saving time and energy of house owners

(iii)Keeping the house mosquito free even when the house owner is away for a long period of time

1.3   Methodology

The construction was carried out in three stages. The first module was the construction of the power unit on the breadboard and then tested; the second module was the construction of the logic unit using the microcontroller on the breadboard and tested while the third module was the construction of the display unit using the LCD.

1.4   Scope of Work

The design and construction of electronic timer mosquito fleet system covered some areas. The system as a prototype can only be used to time how long we want to fleet the room.

1.5   Sources of Material

All the materials (components) used for the construction of this project were sourced locally from electronic vendors at the correct specifications and rating of the components.

1.6 Constraints

Several difficulties were encountered in the course of this project work. Sourcing of materials on and before the commencement of this project work was an uphill task because a lot of finance was spent on transportation to get the materials ready for construction. Also, a lot of money was spent sourcing for materials used in the write-up of this project work.

1.7 Project Outline

The report of this project consists of five chapters. The first chapter introduces the project and states the aims, objectives, motivation, scope of work and limitations. The second chapter gives the literature review and the detailed analysis of the project. The third chapter is the design and implementation stage which forms the major part of this project work; it explains the steps taken to design this project work. The fourth chapter is the testing, result and discussion which analyses the steps taken in construction of the project work and the last chapter which is the conclusion that summarizes the project work, it also contains the recommendation on how to improve on the work and followed by the references.

CHAPTER TWO

2.0   LITERATURE REVIEW/THEORETICAL BACKGROUND

The search of more comfortable and time saving ways to control mosquito by man has led researchers to develop a variety of mosquito control systems. Among these are acoustical devices, some of which have been designed as attractants and others as repellers for mosquitoes. Although acoustic attractants have evident theoretical advantages, there is not still a unanimous criterion about their effectiveness in the field. On the other hand, the alleged repellent effects of different commercial acoustic devices have not been demonstrated in research work done in the field and in laboratory conditions.

Mosquito-born diseases affect millions of people worldwide each year. The bite of a mosquito can result in anything from a skin irritation to contracting malaria. Clearly, mosquitoes are not just a nuisance, but also potentially harmful. By taking measures such as wearing long pants in wooded areas or disposing of standing water, you can minimize the chances of attracting mosquitoes. These measures, however, are often not enough, and specialty products used to combat mosquitoes are required. Each of the products used for mosquito control have varying degrees of effectiveness, and it is important to know that some may be better than others.

2.1 MosquitoNets

There are a variety of mosquito nets available in different sizes, materials and shapes. Each style of net has its advantages, and ensuring that you are using the most suitable one increases your chances of eliminating mosquitoes. It is crucial to find a net that has a mesh size large enough to allow air to circulate, but small enough to keep the mosquitoes out. Mosquito nets can be used to cover small and large areas such as your bed or your porch. Mosquito nets are an effective way to naturally combat mosquitoes.

2.2 Electric mosquito zapper

An electric zapper works by using ultraviolet light to lure in bugs and then kills them upon contact with its lethal dose of electrical charge. Unfortunately, although this is a highly successful way of killing bugs, mosquitoes are not actually attracted to ultraviolet light, and research into this method of mosquito control shows that 90% of what the electric zapper kills are actually insects that do not bite. In fact, some of the bugs that are killed are those that help us eliminate mosquitoes by eating them.

2.3 Mosquito Magnet

Like the electric mosquito zapper, the mosquito magnet is one of several mosquito traps that claim to best eliminate the pesky insects. The mosquito magnet works by releasing a carbon dioxide spray, heat and moisture that the mosquito mistakes for prey. Once the mosquito gets too close to the magnet, it is sucked in and eventually dies of dehydration. The mosquito magnet is run by a propane tank and can therefore be transported anywhere. This form of mosquito control is the most expensive of all methods and there is no conclusive scientific evidence to support its effectiveness.

2.4   Mosquito Repellent

There are a number of natural and chemical mosquito repellents that work to repel mosquitoes. The synthetic chemical repellent, DEET, is the most effective. It is essentially a poison that masks the natural odor and carbon monoxide that is released from the human body. DEET must be used with caution, especially with children. It has been known to cause dizziness and can severely irritate the skin. For these reasons, many people choose to use a natural mosquito repellent like a citronella spray. Citronella has active ingredients that repel mosquitoes and for some, the lemon smell is very appealing

CHAPTER THREE

3.0   DESIGN AND IMPLEMENTATION

3.1   Power Supply Unit

The power supply unit comprises the following

(i) Power transformer unit

(ii) Rectifier unit

(iii)Filtering unit

(iv)Power regulating unit

(v) Filtering circuit

Power Transformer	→	Rectifier	→	Filter	→	Voltage Regulator	→	Filter
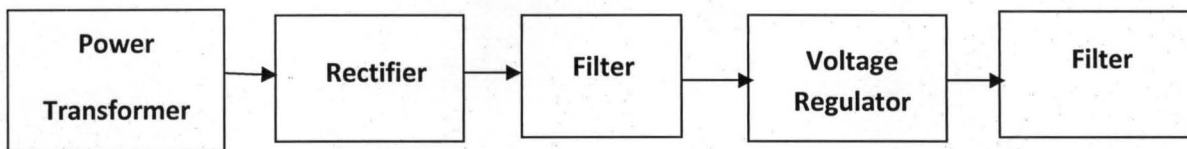
Fig 3.1 Block Diagram of Power Supply Unit
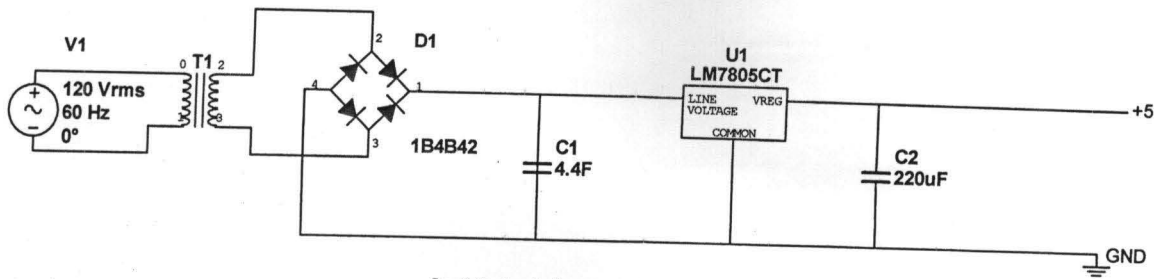
fig. 3.2 circuit diagram of power supply unit

3.1.1 Power Transformer Unit

The first block consists of the transformer. A transformer is an electronic device that steps up or steps down voltage. A 220V/24V was used. A voltage of 220V AC was stepped down to 24 AC.

3.1.1.1   Calculation

Therefore, $V_p = \sqrt{2} \times V_{rms}$ (i)

Where $V_{rms} = 24V$ since the transformer of 220V/24V was used.

$V_p = \sqrt{2} \times 24 = 33.94V$

For safe operation, a 220V/35V transformer was chosen.

3.1.2 Rectifier Circuit

Rectification is a process of changing AC to DC. Diodes are commonly used as rectifiers in power supplies. The 24V AC stepped down from the transformer passes through the full wave bridge rectifier circuit. The rectifier circuit converts it to DC.

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3.1.2.1 Calculation

After rectification, the 24 AC reduces by 1.4V. This is so because for full wave rectification two diodes conduct and two diodes block and since the forward breakdown voltage for a diode is 0.7V, the two voltages add up to give 1.4V. Thus the voltage after full wave rectification is

Voltage after rectification = 24V- (0.7 × 2) = 24- 1.4

$$= 22.6V \text{ DC}$$

It is 22.6V that goes to the filtering circuit.

3.1.3 Filtering Circuit

A filter is used to reduce the amount of AC ripple, thus providing a relatively pure form of DC. The main function of the filter is to minimize the ripple content in the rectifier output. An electrolytic capacitor connected in parallel with the output of the rectifier circuit is used as a filter.

3.1.3.1   Calculation

For bridge rectifier, $V_{p(out)} = V_{p(in)} - 1.4V$, since 0.7V dropped across a diode whenever it conducts. Only two diodes will conduct at a time.

Therefore, $V_{p(out)} = 24\sqrt{2} - 1.4 = 32.54V$

$$dv = (30/100) * 32.54 = 9.76V$$

Therefore, $C = \dfrac{(1 * 0.01)}{9.76} = 1.034 \times 10^{-3}$ F

$$C = 1034\mu F$$

So the commercial value of 4400μF, 35V and 220μF, 35V was used in order to get a very flat DC since the LCD requires a flat level DC for its operation.

3.1.4 Power Regulating Circuit

A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. The entire work will comprise mainly a single microcontroller chip, a relay circuit, a LCD, all of which are low power consuming devices that require a 5V d.c voltage for optimum operation. A LM7805 voltage regulator was used to achieve a 5V output voltage. For proper operation of the LM7805 regulator, the input voltage must be at least 2V above the output voltage. Hence, a 9V transistor radio battery was utilized.

3.1.4.1 Calculation

Then the expected ripple voltage using this value of 1000μF capacitor is calculated as follows

$$dv = \dfrac{(1 * 0.01)}{1000 \times 10^{-6}} = 10.00V$$

This means that the output waveform goes from a peak value of 32.54V to (32.54-10.00)V = 22.54V. It may be noted that the input voltage to the IC regulator must be at least 2V above the output voltage. This is required in order to maintain regulation.

Therefore, peak value of 32.54V to 22.54V is acceptable since the output voltage is 5V. The ripple is neglected by the 7805 regulator.

The average voltage going to the 7805 is calculated by:

$$V_p - 0.5dv = 32.54 - (0.5 \times 10.00)$$

$$= 27.54V$$

The output from the 7805 is 5V at maximum current output of 1A. The output remains constant in spite of input voltage variation.

3.2   Design of Relay Driver Unit

The fleet device was activated by use of a relay via a transistor as the device requires A.C for its operation. The circuit arrangement is shown in the figure below.
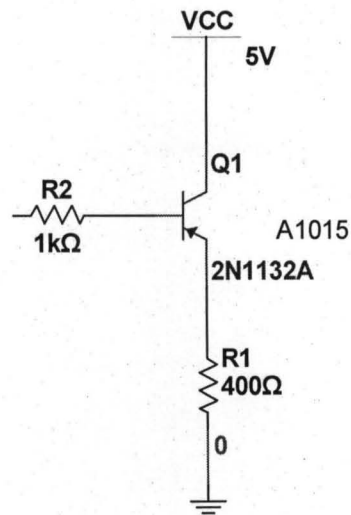
Fig. 3.3   Design of relay driver

The resistance of the relay coil is 400Ω, thus the collector current, I_c is given by;

$$I_c = \frac{5 - 0.7}{400\Omega} = \frac{4.3}{400}$$

$$= 10.73 \text{mA}.$$

$$hFE = \frac{I_c}{I_B}$$

For A1015 transistor, hFE = 254

Thus, $254 = \dfrac{10.75}{I_B}$

$$I_B = \dfrac{10.75}{254}$$

$$I_B = 0.042\text{mA}$$

Thus, minimum base current to ensure saturation is 0.042mA and the maximum base resistance required is;

$$5 / 0.042\text{mA} = 118\text{k}\Omega$$

A value of 1kΩ was used to ensure saturation.

3.3   Circuit Diagram 0f the microcontroller and Lcd
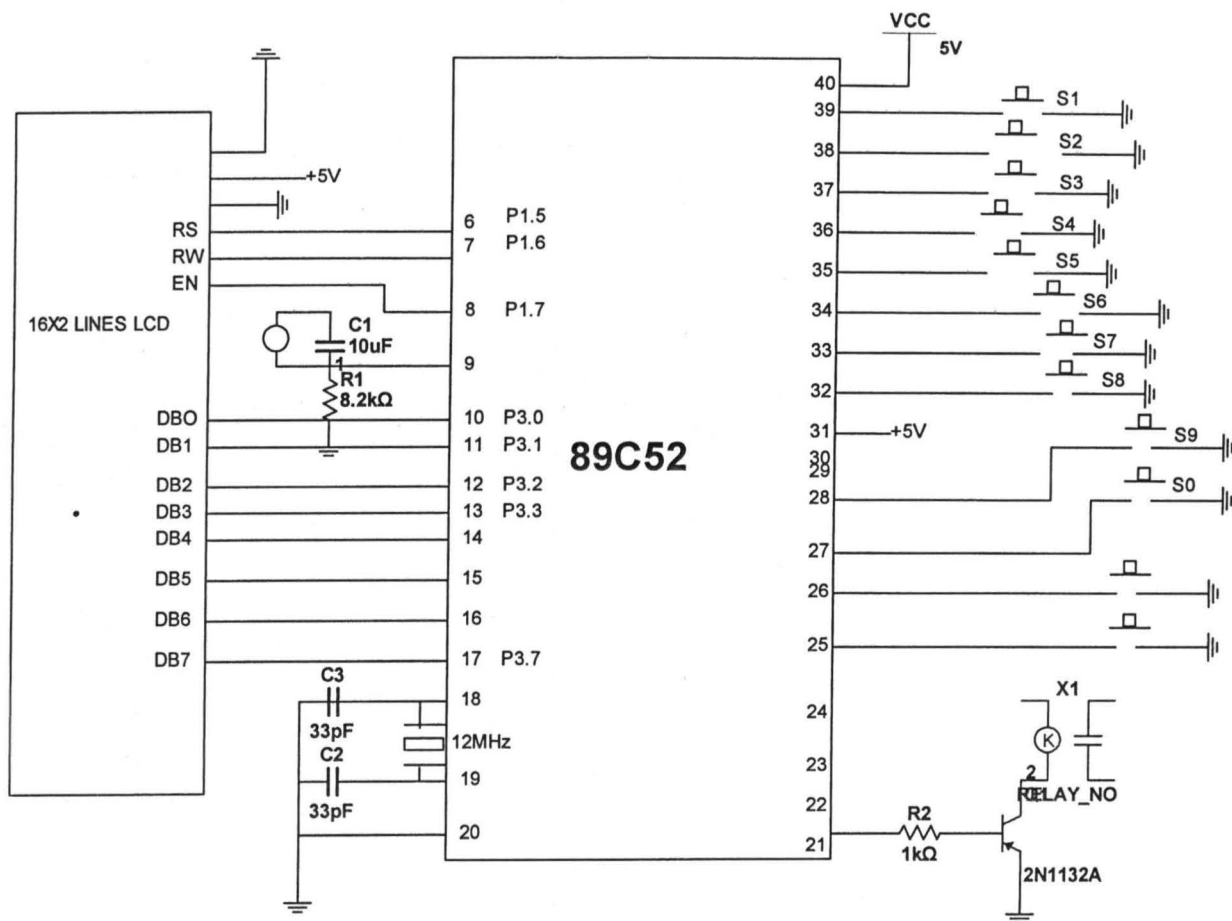
Fig 3.4 Circuit diagram showing the design and construction of an electronic timed mosquito fleeting

system

CHAPTER FOUR

4.0   TESTS, RESULTS AND DISCUSSION

4.1   Tests

Each of the units of the device being constructed was simulated one after the other before being tested on bread board and then finally soldered to the Vero board.

4.2   Results

TEST	PARAMETERS	VALUES
Transformer	Input and output A.C voltage	A value of 220V at the input gave a value of 23.9V at the output.
Regulator	Input and output DC voltage	A value of 30.5V was measured at the input of the regulator and a value of 5V was given at the output
Reset Pin	Voltage level at any point in time and the level at reset	A value of 0.13V was measured at any point of normal operation and a value of 4.97V at reset time.

Table 4.1   Table of Tests, parameters and results

4.3   Discussion

The electronic timed fleeting system works with a circuit that acts like a clock, the main part of my project is the timer circuit that acts like a switch, once the user sets the time on the panel, the circuit automatically supplies power to the fleeting mechanism that fleets/sprays the room once the specified time is reached. The circuit is left on for a while then it goes off and waits for the next time it has to come on.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The target of this project which is the design and construction of an electronic timer mosquito fleet system was achieved as demonstrated by the results obtained from the tests carried out as explained in chapter four

The aim which was to use an electronic timer mosquito fleet system rather than the conventional use of hand to operate the mosquito fleet was achieved. This is an improvement in the control of mosquitoes and malaria, and also the fleeting of the room is now automated thereby saving time and energy.

Though a number of difficulties were encountered at the design and construction stage of this project, consultation and constant research helped to get through

5.2 Recommendation

i.   The system can be made to detect mosquitoes from the sounds they make, and automatically fleet the room once the mosquito noise reaches a certain level

ii.   The system can be made to sense human presence and pause the spraying of the house till nobody is around.

iii. An inverter can be incoporated into the system incase of power failure, since the circuit needs to be constantly connected to a power source.

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APPENDIX I

```
ORG 0000H

    CLR A

    MOV R0,#00H

    MOV R1,#00H

    MOV R2,#00H

    MOV R3,#00H

    MOV R4,#00H

    MOV R5,#00H

    MOV R6,#00H

    MOV R7,#00H

DB0 EQU P3.0

DB1 EQU P3.1

DB2 EQU P3.2

DB3 EQU P3.3

DB4 EQU P3.4

DB5 EQU P3.5

DB6 EQU P3.6

DB7 EQU P3.7

DATA EQU P3

RS EQU P1.2

RW EQU P1.3

EN EQU P1.4

UP EQU P1.1

DOWN EQU P1.0
```

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```
        MOV DATA,#38H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        CLR RS

        MOV DATA,#0FH

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        CLR RS

        MOV DATA,#06H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET

OVERPOYNT:CLR RS

        MOV DATA,#83H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET

FLEET:MOV R2,#10

        CLR P2.0

 HUYY:LCALL OJAY

        DEC R2

        CJNE  R2,#0,HUYY
```

```
        SETB P2.0

        RET

POYNT:LCALL VEENITA

        MOV A,#' '

        LCALL WRITE_TEXT

        MOV A,#' '

        LCALL WRITE_TEXT

        MOV A,#58

        LCALL WRITE_TEXT

        CLR RS

        MOV DATA,#8EH

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        MOV A,#'A'

        LCALL WRITE_TEXT

        MOV A,#'M'

        LCALL WRITE_TEXT

        CLR RS

        MOV DATA,#0CEH

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        MOV A,#'P'

        LCALL WRITE_TEXT

        MOV A,#'M'
```

```
        LCALL WRITE_TEXT

        CLR RS

        MOV DATA,#80H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET
INITLCD:CLR RS

        MOV DATA,#38H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        CLR RS

        MOV DATA,#0EH

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        CLR RS

        MOV DATA,#06H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET
CLR_LCD:CLR RS

        MOV DATA,#01H

        SETB EN
```

```
          CLR EN

          LCALL WAIT_LCD

          RET

WAIT_LCD:CLR EN

          CLR RS

          SETB RW

          MOV DATA,#0FFH

          SETB EN

          MOV A, DATA

          INC R3

          CJNE R3,#255,RAYZOR

          SJMP OZIL

RAYZOR:   JB ACC.7,WAIT_LCD

          CLR EN

          CLR RW

OZIL:     MOV R3,#00H

          RET

WRITE_TEXT:SETB RS

             MOV DATA,A

             SETB EN

             CLR EN

             LCALL WAIT_LCD

             RET


NEXT_LINE:CLR RS

          MOV DATA,#0C0H
```

```
        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET

OJANE:MOV R2,#60

UIT:LCALL OJAY

    DEC R2

    CJNE R2,#0,UIT

    RET


OJAY:LCALL OJ

    INC R0

    CJNE R0,#14H, OJAY

    MOV R0,#00H

    RET

OJ:MOV TMOD,#01

   MOV TL0,#0H

   MOV TH0,#3CH

   SETB TR0

   JNB TF0,$

   CLR TF0

   CLR TR0

   RET

VEENITA:LCALL INIT_LCD

        LCALL CLR_LCD

        RET
```

```
VEENA:LCALL INITLCD

        LCALL CLR_LCD

        RET

UMAR: JNB P2.6,TENOJ

     JNB P0.0,ONEOJ

     JNB P1.5,UMAR

     JNB P0.1,TWOOJ

     JNB P0.2,THROJ

     JNB P0.3,FOUOJ

     JNB P0.4,FIVOJ

     JNB P1.6,UMAR

     JNB P0.5,SIXOJ

     JNB P0.6,SEVOJ

     JNB P0.7,EIGOJ

     JNB P2.7,NINOJ


     SJMP UMAR

ONEOJ:JNB P0.0,$

      SJMP ONE

TWOOJ:JNB P0.1,$

      SJMP TWO

THROJ:JNB P0.2,$

      SJMP THR

FOUOJ:JNB P0.3,$

      SJMP FOU

FIVOJ:JNB P0.4,$
```

```
        SJMP FIV
SIXOJ:JNB P0.5,$
        SJMP SIX
SEVOJ:JNB P0.6,$
        SJMP SEV
EIGOJ:JNB P0.7,$
        SJMP EIG
NINOJ:JNB P2.7,$
        SJMP NIN
TENOJ:JNB P2.6,$
        SJMP TEN
ONE:MOV A,#'1'
    MOV R1,#1
SJMP ESS
TWO:MOV A,#'2'
    MOV R1,#2
SJMP ESS
THR:MOV A,#'3'
    MOV R1,#3
SJMP ESS
FOU:MOV A,#'4'
    MOV R1,#4
SJMP ESS
FIV:MOV A,#'5'
    MOV R1,#5
SJMP ESS
```

```
SIX:MOV A,#'6'

    MOV R1,#6

SJMP ESS

SEV:MOV A,#'7'

    MOV R1,#7

SJMP ESS

EIG:MOV A,#'8'

    MOV R1,#8

SJMP ESS

NIN:MOV A,#'9'

    MOV R1,#9

SJMP ESS

TEN:MOV A,#'0'

    MOV R1,#0

ESS:LCALL OJ

    LCALL WRITE_TEXT

    RET


UMARU:CJNE A,#1,TOOO

    MOV A,#'1'

    SJMP DEAR

TOOO:CJNE A,#2,TERE

    MOV A,#'2'

    SJMP DEAR

TERE:CJNE A,#3,FOUUR

    MOV A,#'3'
```

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```
        SJMP DEAR

FOUUR:CJNE A,#4,FAIVE

        MOV A,#'4'

        SJMP DEAR

FAIVE:CJNE A,#5,SEX

        MOV A,#'5'

        SJMP DEAR

SEX:CJNE A,#6,SAVEN

        MOV A,#'6'

        SJMP DEAR

SAVEN:CJNE A,#7,EITE

        MOV A,#'7'

        SJMP DEAR

EITE:CJNE A,#8,NAINE

        MOV A,#'8'

        SJMP DEAR

NAINE:CJNE A,#9,TAEN

        MOV A,#'9'

        SJMP DEAR

TAEN:MOV A,#'0'

DEAR:LCALL WRITE_TEXT

        RET


WRITER:LCALL VEENA

        MOV A,R6

        MOV B,#10
```

```
        DIV AB

        LCALL UMARU

        MOV A,B

        LCALL UMARU

        MOV A,#58

        LCALL WRITE_TEXT

        MOV A,R7

        MOV B,#10

        DIV AB

        LCALL UMARU

        MOV A,B

        LCALL UMARU

        JB P2.3,FAISAL

        CLR RS

     MOV DATA,#8EH

     SETB EN

     CLR EN

     LCALL WAIT_LCD

     MOV A,#'A'

     LCALL WRITE_TEXT

     MOV A,#'M'

     LCALL WRITE_TEXT

     RET

FAISAL:CLR RS

     MOV DATA,#8EH

     SETB EN
```

```asm
        CLR EN

        LCALL WAIT_LCD

        MOV A,#'P'

        LCALL WRITE_TEXT

        MOV A,#'M'

        LCALL WRITE_TEXT

        RET


HELLO:LCALL VEENA

        MOV A,#'H'

        LCALL WRITE_TEXT

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#'L'

        LCALL WRITE_TEXT

        MOV A,#'L'

        LCALL WRITE_TEXT

        MOV A,#'O'

        LCALL WRITE_TEXT

        MOV A,#' '

        LCALL WRITE_TEXT

        MOV A,#'T'

        LCALL WRITE_TEXT

        MOV A,#'U'

        LCALL WRITE_TEXT

        MOV A,#'J'
```

```
        LCALL WRITE_TEXT

        MOV A,#'O'

        LCALL WRITE_TEXT

        RET


ENTFT:LCALL VEENITA

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#'N'

        LCALL WRITE_TEXT

        MOV A,#'T'

        LCALL WRITE_TEXT

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#'R'

        LCALL WRITE_TEXT

        MOV A,#' '

        LCALL WRITE_TEXT

        MOV A,#'F'

        LCALL WRITE_TEXT

        MOV A,#'L'

        LCALL WRITE_TEXT

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#'E'

        LCALL WRITE_TEXT
```

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```
MOV A,#'T'
LCALL WRITE_TEXT
MOV A,#' '
LCALL WRITE_TEXT
MOV A,#'T'
LCALL WRITE_TEXT
MOV A,#'I'
LCALL WRITE_TEXT
MOV A,#'M'
LCALL WRITE_TEXT
MOV A,#'E'
LCALL WRITE_TEXT
LCALL NEXT_LINE
MOV A,#'I'
LCALL WRITE_TEXT
MOV A,#'N'
LCALL WRITE_TEXT
LCALL IMPRESS
MOV A,#'5'
LCALL WRITE_TEXT
LCALL OJAY
LCALL IMPRESS
MOV A,#'4'
LCALL WRITE_TEXT
LCALL OJAY
LCALL IMPRESS
```

```
        MOV A,#'3'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESS

        MOV A,#'2'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESS

        MOV A,#'1'

        LCALL WRITE_TEXT

        LCALL OJAY

        RET

IMPRESS: CLR RS

        MOV DATA,#0C3H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET


ENTPT:LCALL VEENA

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#'N'

        LCALL WRITE_TEXT

        MOV A,#'T'

        LCALL WRITE_TEXT
```

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```
MOV A,#'E'

LCALL WRITE_TEXT

MOV A,#'R'

LCALL WRITE_TEXT

MOV A,#' '

LCALL WRITE_TEXT

MOV A,#'P'

LCALL WRITE_TEXT

MOV A,#'R'

LCALL WRITE_TEXT

MOV A,#'E'

LCALL WRITE_TEXT

MOV A,#'S'

LCALL WRITE_TEXT

MOV A,#'E'

LCALL WRITE_TEXT

MOV A,#'N'

LCALL WRITE_TEXT

MOV A,#'T'

LCALL WRITE_TEXT

LCALL NEXT_LINE

MOV A,#'T'

LCALL WRITE_TEXT

MOV A,#'I'

LCALL WRITE_TEXT

MOV A,#'M'
```

```
        LCALL WRITE_TEXT

        MOV A,#'E'

        LCALL WRITE_TEXT

        MOV A,#' '

        LCALL WRITE_TEXT

        MOV A,#'I'

        LCALL WRITE_TEXT

        MOV A,#'N'

        LCALL WRITE_TEXT

        LCALL IMPRESSE

        MOV A,#'5'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESSE

        MOV A,#'4'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESSE

        MOV A,#'3'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESSE

        MOV A,#'2'

        LCALL WRITE_TEXT

        LCALL OJAY

        LCALL IMPRESSE
```

```
        MOV A,#'1'

        LCALL WRITE_TEXT

        LCALL OJAY

        RET

IMPRESSE: CLR RS

        MOV DATA,#0C8H

        SETB EN

        CLR EN

        LCALL WAIT_LCD

        RET

CT:LCALL OJAY

   LCALL OJAY

   LCALL HELLO

   LCALL OJAY

   LCALL OJAY

   LCALL OJAY

   LCALL OJAY

   LCALL OJAY

LCALL ENTFT

LCALL POYNT

CLR P1.5

LCALL UMAR

SETB P1.5

MOV A,R1

MOV R2,A

LCALL UMAR
```

```
MOV A,R2

MOV B,#10

MUL AB

ADD A,R1

MOV R4,A

LCALL OVERPOYNT

CLR P1.6

LCALL UMAR

SETB P1.6

MOV A,R1

MOV R2,A

LCALL UMAR

MOV A,R2

MOV B,#10

MUL AB

ADD A,R1

MOV R5,A

AMPM:JNB UP,AM

     JNB DOWN,PM

     SJMP AMPM

AM:JNB UP,$

   CLR P2.2

   SJMP OIT

   LCALL OJ

PM:JNB DOWN,$

   LCALL OJ
```

```
OIT:LCALL ENTPT

     LCALL POYNT

     CLR P1.5

     LCALL UMAR

     SETB P1.5

MOV A,R1

MOV R2,A

LCALL UMAR

MOV A,R2

MOV B,#10

MUL AB

ADD A,R1

MOV R6,A

LCALL OVERPOYNT

     CLR P1.6

LCALL UMAR

     SETB P1.6

MOV A,R1

MOV R2,A

LCALL UMAR

MOV A,R2

MOV B,#10

MUL AB

ADD A,R1

MOV R7,A

AMEPM:JNB UP,AME
```

```
        JNB DOWN,PME

        SJMP AMEPM

AME:JNB UP,$

    LCALL OJ

    CLR P2.3

    SJMP OITE

PME:JNB DOWN,$

    LCALL OJ

OITE:LCALL WRITER

      LCALL OJANE

      INC R7

      MOV DPH,R4

      MOV DPL,R5

      MOV A,R6

      CJNE A,DPH,LIU

      MOV A,R7

      CJNE A,DPL,LIU

BYC:JB P2.2,MIU

    JNB P2.3,TAIE

    SJMP LIU

MIU: JNB P2.3,LIU

TAIE:LCALL FLEET


  LIU:CJNE R7,#60,OITE

      MOV R7,#00

      CJNE R6,#12,FAISA
```

```
        MOV R6,#00

        CPL P2.3

FAISA:INC R6

        LJMP OITE
```